

# High Volume TSP Sampler Bias Shootout in SCAQMD

2014 NAAMC, Quality Assurance  
South Coast Air Quality Management District  
August 13, 2014

# Background

- ▶ In 2008, U.S. EPA Adopted new Pb Rule
  - Strengthened Standard to 0.15 ug/m<sup>3</sup>
  - Report in local conditions
  - Air regulation agencies needed to deploy monitors
- ▶ Assessment of Samplers (PEP program)
  - Motors with brushes vs. Brushless motors in pump
  - Volumetric control vs. Mass flow controller
  - Inlet design and sampler placement
  - Altitude
  - Temperature
- ▶ U.S EPA / SCAQMD Collaboration to Conduct a Pb Sampler Shootout in 2012 through 2013

# Pb Shootout Design

- ▶ Collocation of multiple samplers from different vendors
- ▶ Two Sites
  - High elevation – Big Bear
  - Low elevation – Compton
- ▶ Varied Seasons
- ▶ Analysis Conducted by U.S. EPA Region 9 Lab
  - FEM ICP–MS Method



USEPA REGION 9 LABORATORY  
RICHMOND, CALIFORNIA

STANDARD OPERATING PROCEDURE 009  
DETERMINATION OF LEAD ON FILTERS BY ICP-MS

Revision 1  
Effective Date: November 15, 2011

Reviewed by: [Signature] 01/11/11  
Richard Rouse  
Chemistry Team Leader/Technical Director Date

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K. W. Hendrix, Laboratory QA Officer Date

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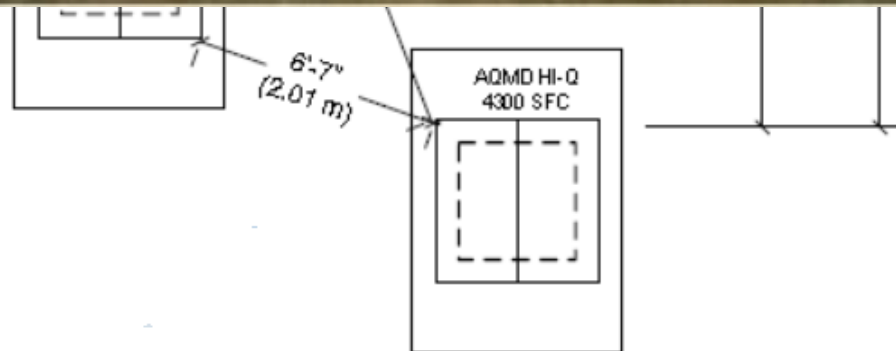
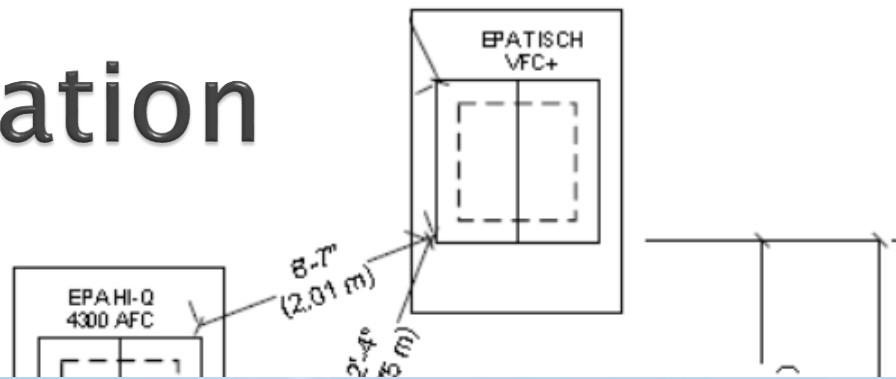
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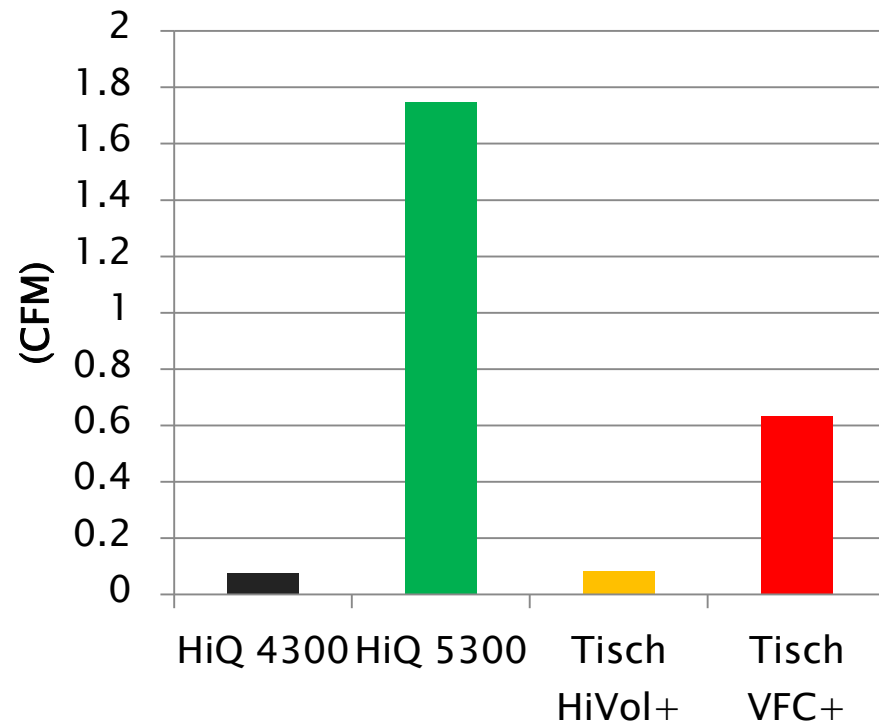
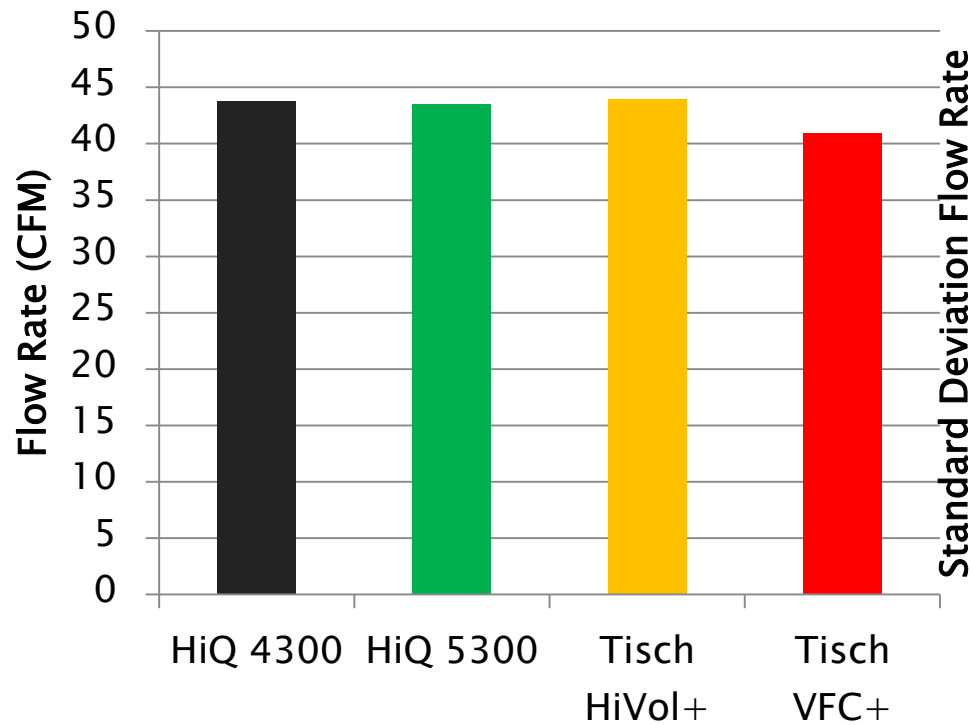
# Sampling Instruments

Manufacturer	Model	Motor	Flow Type	Other Comments
HiQ	4300	Brushless	Mass Flow	Modified temperature sensor w solar shield; micro SD card
HiQ	5300	Brushless	Mass Flow	Modified temperature sensor w solar shield; micro SD card
Tisch	5170	Brushless	Mass Flow	USB or SD card
Tisch	5170 HV	Brush	Volumetric	USB or SD card

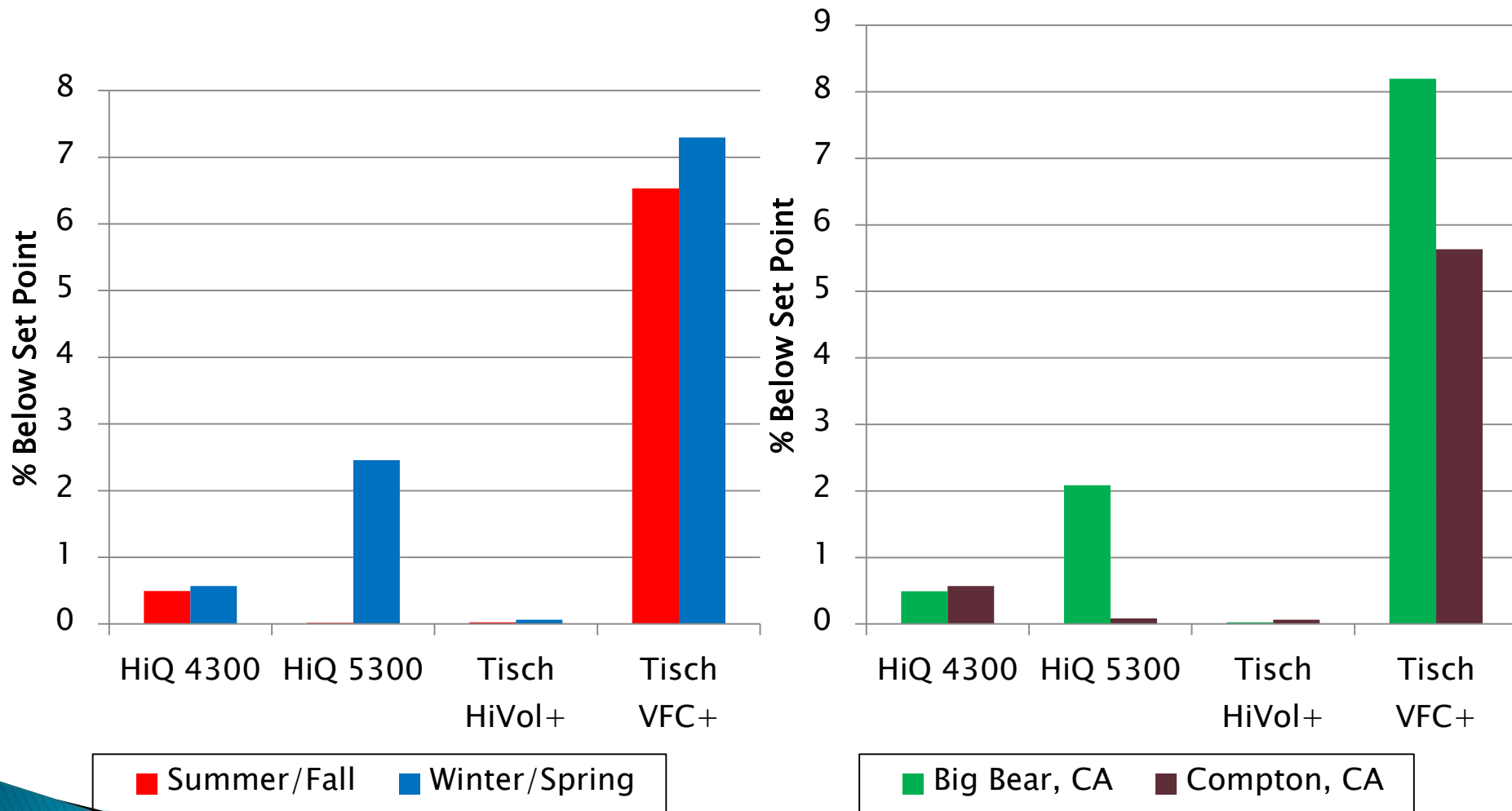
# Configuration



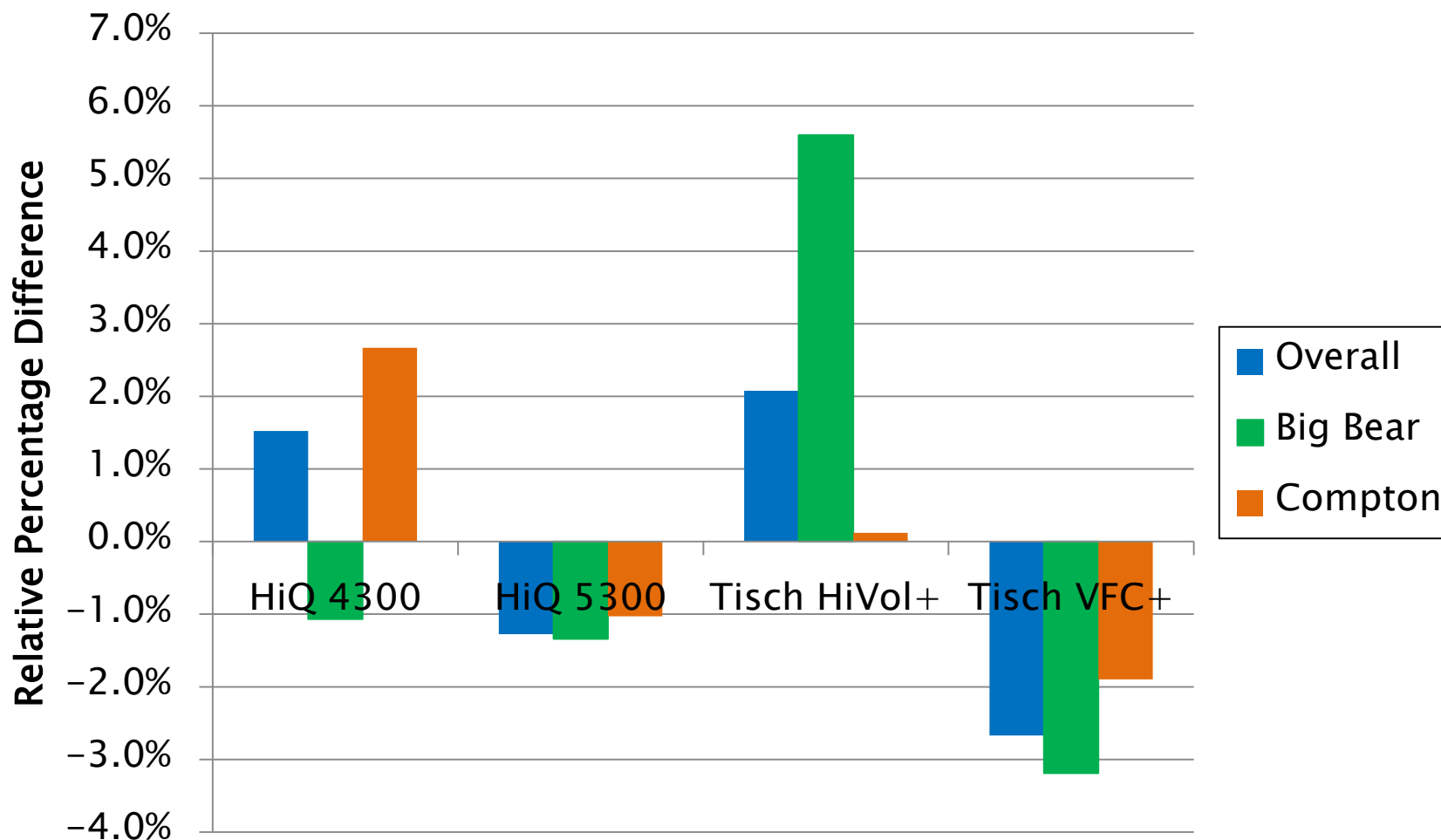
# Results: Flow Precision



# Results: Flow Rate Set Point



# Results: Pb Concentration



# Summary

- ▶ Altitude and season conditions tested had minimal impact on sampler performance
- ▶ Mass flow controlled units were able to sustain closer to the 44 cfm setpoint than the volumetric flow controlled units
- ▶ Orientation of the sampler had some impact relative to where the temperature probe is located relative to sampler heating from the sun
- ▶ Overall Pb results were consistent between the 4 samplers



# Questions?

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